

WHAT IS CLAIMED IS:

1. A method for fabricating a resist mask for the patterning of semiconductor substrates, comprising:
 - providing a semiconductor substrate;
 - applying photosensitive resist on the semiconductor substrate, wherein a photoresist film is obtained;
 - exposing the photoresist film, wherein an exposed resist film is obtained;
 - developing the exposed resist film in a development step comprising:
 - applying a developer to the exposed resist film that strips the exposed resist film, so that a patterned resist film is obtained;
 - removing the developer;
 - applying a cationic surfactant to the patterned resist film; and
 - drying the patterned resist film, so that a resist mask is obtained.
2. The method of claim 1, wherein the developer is removed by being displaced by a rinsing medium.
3. The method of claim 2, wherein the cationic surfactant is contained in the rinsing medium.
4. The method of claim 2, wherein the developer is removed in a first rinsing step using deionized water as a rinsing medium, and wherein the cationic surfactant is contained in an aqueous rinsing solution used as rinsing medium in a second rinsing step.
5. The method of claim 4, wherein the rinsing solution containing the cationic surfactant is left on the patterned resist film for a duration of 10 to 120 seconds.

6. The method of claim 1, wherein the cationic surfactant comprises a tertiary ammonium group.
7. The method of claim 1, wherein the cationic surfactant is a trimethylalkylammonium salt whose alkyl group comprises more than 8 carbon atoms.
8. The method of claim 1, wherein the cationic surfactant is used as a bromide or hydrogensulfate.
9. The method of claim 1, wherein the photoresist film is formed as a single-layer resist film.
10. The method of claim 1, wherein the photoresist is a positive photoresist.
11. The method of claim 1, wherein the photoresist is a chemically amplified photoresist.
12. The method of claim 1, wherein the resist mask comprises structure elements having an aspect ratio of greater than 3.
13. The method of claim 1, wherein the exposure is effected by means of radiation having a wavelength of less than 200 nm.
14. The method of claim 1, wherein the concentration of the cationic surfactant in the rinsing medium is chosen such that a rinsing medium that has remained in a trench arranged between webs of the patterned resist forms a contact angle θ_1 with the sidewall of the resist web of approximately 90° .

15. The method of claim 1, wherein the concentration of the cationic surfactant in the rinsing medium is less than the critical micelle concentration (CMC).
16. A method for forming a patterned resist layer comprising:
providing a substrate;
applying a resist layer to the substrate;
selectively exposing the resist layer to form a set of unexposed resist regions and a set of exposed resist regions;
developing the resist layer using a developer, wherein one of the sets of regions chosen from the set of unexposed regions and the set of exposed regions is removed, wherein a patterned resist layer is formed;
exposing the patterned resist layer to a cationic surfactant; and
drying the resist layer, wherein a resist mask is formed.
17. The method of claim 16, further comprising displacing the developer using a first rinsing medium.
18. The method of claim 17, wherein the first rinsing medium includes a cationic surfactant.
19. The method of claim 17, further comprising adding a second rinsing medium after the first rinsing medium, wherein the second rinsing medium includes an aqueous solution of a cationic surfactant.

20. The method of claim 19, wherein the first rinsing medium consists essentially of deionized water.